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DIGITAL WATERMARKING BASED ON ENTROPY CALCULATION & REVERSE BIORTHOGONAL DWT

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ABSTRACT

Presently, info concealment has become a major topic of engineering science attributable to the increasing quality of the web and also the essential want of information security. With relevancy to the final info concealment drawback, an exchange is concerned between strength, visibility and capability. There are several watermarking techniques and models and every of them has some benefits and downsides. Principally utilized in conjunction with unfold spectrum watermarking, sensory activity shaping refers to the thought of adjusting the strength of the watermark supporting the sensory activity sensitivity of an area within the image. Of these strategies some use models that assign weights to numerous regions of the image. This paper offers some ways of embedding watermarks in a manner that will increase robustness and reduces sensory activity degradation and machine complexity. When the image is interpolated and histogram equalized, the entropy is calculated for different domains particularly Grayscale, DCT and RBOI DWT. Solely DWT domain has shown higher entropy and PSNR. Therefore, DWT domain is taken into account higher for watermarking as compared to other domains and watermark is embedded. The selection of high entropy segments ensures that the method is robust, as low entropy segments would be a lot of sensitive to attacks.

KEYWORDS: Introduction, Entropy Calculation, Reverse Biorthogonal Decomposition, Results

INTRODUCTION

Digital watermarking may be defined as a method during which some data is embedded at intervals in a digital media in order that the inserted information becomes a part of the media. This system serves variety of functions like broadcast watching, information authentication, information compartmentalization then forth. A digital watermarking system should with success satisfy trade-offs between conflicting needs of sensory activity transparency, information capability and strength against attacks. Watermarks have 2 classes of roles: within the initial class, the watermark is taken into account as a transmission code and therefore the decoder should recover the entire transmitted data properly. Within the second class, the watermark is a verification code. within the latter system, the watermark detector should merely verify the presence of a particular pattern. In twenty years, a colossal demand for digital media transmission and distribution has created the copyright protection of transmission contents to be an excellent concern. Since secret writing system became associate degree approach of content protection in communications; the event of digital watermarking technology has created it doable once those contents area unit decrypted. the foremost necessary performances of a digital watermarking system area unit physical property and strength. The first content needn't have any quality distortion once the watermark is embedded. In alternative words the watermark ought to be clear to associate degree observer. And then, once the watermarked content is ready for transmission and distribution, it should be long-faced with several common processes

like compression and noise addition. However, if the changeableness property relaxes constraints of invisibleness, it should conjointly introduce separation in information protection. In fact, the image isn't protected once the watermark is removed. So, even if watermark removal is feasible, its physical property has got to be warranted as most applications have a high interest to keep the watermark within the image as long as doable, taking advantage of the continual protection watermarking offers within the storage, transmission and conjointly process of the data. this is often the explanation why, there's still a desire for reversible techniques that introduce all-time low distortion doable with high embedding capability. Since the introduction of the idea of reversible watermarking within the Barton patent, many ways are planned.

Digital watermarks are also used to verify the genuineness or integrity of the carrier signal or to indicate the identity of its house owners. It's conspicuously used for tracing copyright infringements and for bank note authentication.

If a digital watermark distorts the carrier signal during a approach that it becomes perceivable, it's of no use. Ancient Watermarks are also applied to visible media (like pictures or video). Whereas in digital watermarking, the signal is also audio, pictures, video, texts or 3D models. A signal could carry many completely different watermarks at constant time. In contrast to data that's value-added to the carrier signal, a digital watermark doesn't modify the scale of the carrier signal. The required properties of a digital watermark rely upon the employment case during which it is applied. For marking media files with copyright data, a digital watermark has got to be rather strong against modifications which will be applied to the carrier signal. Instead, if integrity has got to be ensured, a fragile watermark would be applied.

Both steganography and digital watermarking use steganography techniques to insert information covertly in clattering signals. However, whereas steganography aims for physical property to human senses, digital watermarking tries to manage the strength as high priority. Since a digital copy of information is the same because the original digital watermarking may be a passive protection tool. It simply marks information, however doesn't degrade it, nor controls access to the information. One application of digital watermarking is supply following. A watermark is embedded into a digital signal at every purpose of distribution. If a replica of the work is found later, then the watermark is also retrieved from the copy and therefore the supply of the distribution is thought.

Digital watermarking is one among the planned solutions for copyright protection of transmitting information. This system is better than Digital Signatures and alternative ways as a result of it doesn't increase overhead. During this paper an attempt is made to gift a replacement image watermarking technique which will insert a lot of range of watermark bits within the cowl image while not moving the physical property and increase the safety of watermarks .

LITRATURE SURVEY

Sidham Abhilash, S M Shamseerdaula in 2013[1]. He planned a unique lossless sturdy reversible Watermarking methodology for Copyright Protection of pictures. Sturdy reversible watermarking (RRW) strategies square measure standard in transmission for safeguarding copyright, whereas conserving flawlessness of host pictures and providing hardiness against unintentional attacks. However, standard RRW strategies aren't pron to applicable in follow. That's in the main because:

- they fail to supply satisfactory changeability on large-scale image datasets;
- they need restricted hardiness in extracting watermarks from the watermarked pictures destroyed by completely different unintentional attacks; and
- a number of them suffer from extraordinarily poor physical property for watermarked pictures.

Therefore, it's necessary to possess a framework to handle these 3 issues, and improve its performance. This paper presents a unique pragmatic framework, wavelet-domain applied math amount bar chart shifting and agglomeration (WSQH-SC). Compared with standard strategies, WSQH-SC ingeniously constructs new watermark embedding and extraction procedures by bar chart shifting and agglomeration, that square measure necessary for up hardiness and reducing run-time quality. in addition, WSQH-SC includes the property-inspired element adjustment to effectively handle overflow and underflow of pixels. This ends up in satisfactory changeability and physical property. moreover, to extend its sensible relevance, WSQH-SC styles AN increased pixel-wise masking to balance hardiness and physical property. we tend to perform in depth experiments over natural, medical, and artificial aperture microwave radar pictures to indicate the effectiveness of WSQH-SC by comparison with the bar chart rotation-based and bar chart distribution unnatural strategies. Index Terms— whole number wave remodel, k-means agglomeration, masking, sturdy reversible watermarking (RRW).

Mikhail. J. Atallah(2000)[2]first planned the linguistic communication watermarking theme exploitation the grammar structure of text wherever the grammar tree is constructed and transformations square measure applied thereto to plant the watermark conserving all inherent properties of the text. They developed techniques for embedding a strong watermark in text by variety of knowledge assurance and security techniques with the advanced and resources of linguistic communication process.

Huang ANd Yan(2001)[3] planned an rule supported a median inter-word distance in every line. The distances square measure adjusted in line with the undulation of a selected section and frequency. The feature {and the|and therefore the|and conjointly the} element level algorithms were also developed that mark the documents by modifying the stroke options like dimension or line . rule that utilizes grey scale image of text was conjointly developed.. Another rule that watermarks text document image exploitation edge direction bar chart was conjointly planned

Young-Won Kim(2003)[4][6] planned a text watermarking rule supported word classification and inter-word house statistics . during this approach, all the words in an exceedingly text document square measure categoryified betting on some text options then adjacent words comprise a section which section is classed betting on class labels of the words inside the section. the knowledge is encoded by modifying some statistics of inter-word areas of the segments happiness to constant category. many blessings over the traditional word-shift algorithms square measure mentioned.

Yang and Kot(2004)[7] planned a way for watermarking on text document pictures to attest the owner or licensed user is planned. The planned methodology makes use of the integrated inhume character and word areas for watermark embedding. AN overlapping part that is of size 3 is used, whereby the connection of the left and right areas of the character is utilized for the watermark embedding. The integrity of the document will be ensured by comparison the hash price of the character elements of the document before and when watermark embedding, which may be applied to alternative line shifting and word-shifting strategies in addition.

Villan, Mikkilineni(2004)[8] analyzed the theoretical sensible aspects of text knowledge concealment in written documents. et al. worked to boost knowledge concealment and watermark embedding capability of written paper documents. planned rule for authentication of text document exploitation digital watermarking. Text document pictures were compared to guage changes..

Abdullah ANd Wahab(2008)[5] conferred a text watermarking theme targeting an object based mostly setting. the guts of the planned answer describes the idea of watermarking AN object based mostly text document wherever every and each text string is amused as a separate object having its own set of properties. Taking advantage of the z-ordering of objects, watermark is applied with the coordinate axis rental zero fidelity disturbances to the text., the watermark detector

should merely confirm the presence of a selected pattern. In twenty years an enormous demand for digital media transmission and distribution has created the copyright protection of transmission contents to be a good concern. Since cryptography system became AN approach of content protection in communications, the event of digital watermarking technology has created it potential once those contents square measure decrypted. the foremost necessary performances of a digital watermarking system square measure physical property and hardiness. the first content needn't have any quality distortion once the watermark is embedded. In alternative words the watermark ought to be clear to AN observer. And then, once the watermarked content is ready for transmission and distribution, it should be long-faced with several common processes like compression, noise addition, filtering and then very much like some malicious attacks. However, if the changeability property relaxes constraints of physical property, it should conjointly introduce separation in knowledge protection. In fact, the image isn't protected once the watermark is removed. So, even if watermark removal is feasible, its physical property needs to be secure as most applications have a high interest to keep the watermark within the image as long as potential, taking advantage of the continual protection watermarking offers within the storage, transmission and conjointly process of the knowledge. this is often the explanation why, there's still a requirement for reversible techniques that introduce very cheap distortion potential with high embedding capability. Since the introduction of the idea of reversible watermarking within the Barton patent, many strategies are planned.

In this paper we tend to discuss the essence of knowledge transmission in digital watermarking system and also the dissymmetric digital watermarking framework lived on media content communication. Then we tend to propose a universal entropy masking model for watermarking embedding rule to stay the balance between physical property and hardiness. conjointly Through the experiments we tend to conclude that an acceptable domain of entropy calculation can end in optimum watermarking performance.

Watermarking is that the method of concealment digital data in an exceedingly carrier signal; the hidden data ought to, however doesn't ought to contain a reference to the carrier signal. Digital watermarks could also be accustomed verify the believability or integrity of the carrier signal or to indicate the identity of its house owners. it's conspicuously used for tracing copyright infringements and for paper money authentication. Like ancient watermarks, digital watermarks square measure solely perceptible beneath bound conditions, i.e. when exploitation some rule, and invisible anytime else. If a digital watermark distorts the carrier signal in an exceedingly means that it becomes perceivable, it's of no use. ancient Watermarks could also be applied to visible media (like pictures or video), whereas in digital watermarking, the signal could also be audio, pictures, video, texts or 3D models. a proof could carry many completely different watermarks at constant time. not like information that's supplementary to the carrier signal, a digital watermark doesn't amendment the scale of the carrier signal. The required properties of a digital watermark rely on the employment case within which it's applied. For marking media files with copyright data, a digital watermark needs to be rather sturdy against modifications which will be applied to the carrier signal. Instead, if integrity needs to be ensured, a fragile watermark would be applied.

Both steganography and digital watermarking use steganography techniques to plant knowledge covertly in clattery signals. however whereas steganography aims for physical property to human senses, digital watermarking tries to manage the hardiness as prime priority. Since a digital copy of knowledge is that the same because the original, digital watermarking could be a passive protection tool. It simply marks knowledge, however doesn't degrade it nor controls access to the info. One application of digital watermarking is supply pursuit. A watermark is embedded into a digital signal at every purpose of distribution. If a duplicate of the work is found later, then the watermark could also be retrieved from the copy and also the supply of the distribution is understood. this method reportedly has been accustomed observe the supply of lawlessly traced movies.

Digital watermarking is one in every of the planned solutions for copyright protection of transmission knowledge. this method is best than Digital Signatures and alternative strategies as a result of it doesn't increase overhead. during this paper conceive to gift a brand new image watermarking technique which will plant additional range of watermark bits within the cowl image while not touching the physical property and increase the protection of watermarks. Digital watermarking is that the method of embedding data into a digital signal in an exceedingly means that's tough to get rid of. The signal could also be audio, footage or video. during this paper image is that the host signal and embedding the key knowledge and also the extract constant. during this method we will enhance the network security.

OVERVIEW OF OUR PROPOSED SYSTEM

Entorpy Calculation

In our proposed system we first impliment interpolation over the original image using billinear interplotion, on hte interploted image we do histogram equilization so that the histogram of original image distributed throughly and we can embed watermark anywhere over the original image. After that entropy is calculated in three domain and the finding shows that the entropy over the DWT Rbio domain is maximum so for embeding the watermark the DWT rbio domain is much suitable over the other domain like grayscale and DCT domain as low entropy is the much vunrable to attack. The PSNR over the three somain is shown in the figure 1. So we embed the watermark in DWT rbio domain and quite intresting finding are achieved. Like the PSNR of the watermatked image over the original image is always comes out to be more than 85 for the difrent images.

Reverse Biorthogonal Decomposition

Now for watermarking we decompose the original image and watermark imge using revers biorthogonal discrete wavelet, And over the watermark image we do histogram scalling(the scalling factor in our case is 0.00001). now for embeding the watermark we simply add the decomposed watermark with the original decomposed image.

Now for obtaing the watermark at the destination the watermarked image again decomposed using rbio DW and it is subtracted from the original decompsed image and over the difference inverse rbio DW is apllied.

RESULTS

We have tested our algorithm on MATLAB plateform version 7.5, with dual core computer processor having speed 1.85ghz and RAM 2gb, and the following results are obtained. From the figure 1 it is visible that the entropy at DWT domain is maximum and the PSNR of the watermarked image is 88.1767 is achived with this watermarkin method.

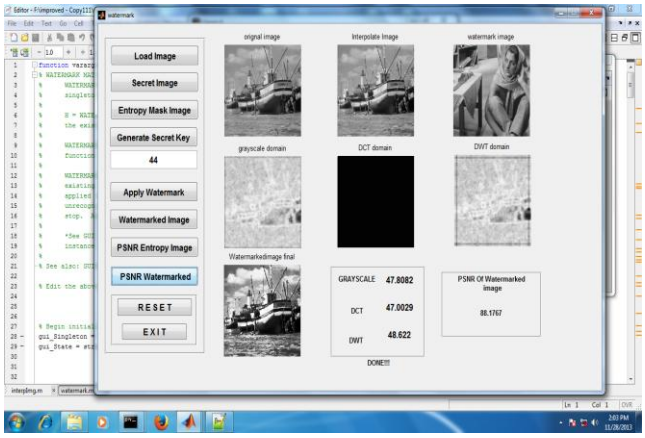

Figure 1: GUI of our Proposed System Showing the Entropy Calculation at Different Scale and the PSNR of the Watermarked Image

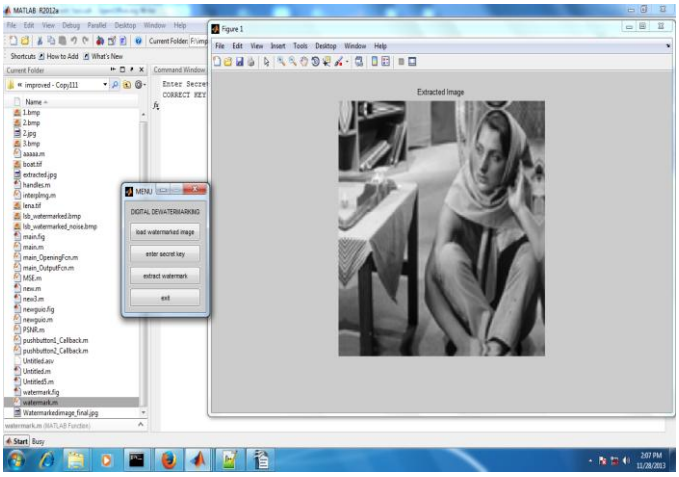

Figure 2: Shows the Extraction of Watermark

CONCLUSIONS

In this paper we offers some ways of embedding watermarks in a manner that will increase robustness and reduces sensory activity degradation and machine complexity. When the image is interpolated and histogram equalized, the entropy is calculated for different domains particularly Grayscale, DCT and RBOI DWT. Solely DWT domain has shown higher entropy and PSNR. Therefore, DWT domain is taken into account higher for watermarking as compared to other domains and watermark is embedded. The selection of high entropy segments ensures that the method is robust, as low entropy segments would be a lot of sensitive to attacks. Also we conclude from the experiments that a suitable domain of entropy calculation will result in optimal watermarking performance.

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